

3.10 Fundamental Identities

Name _____ Date _____ Period _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Use basic identities to simplify the expression. Show work!

1) $\tan \theta \cos \theta$ 1) _____

2) $\sec \theta \sin \left(\frac{\pi}{2} - \theta \right)$ 2) _____

3) $\frac{1 + \tan^2 \theta}{\csc^2 \theta}$ 3) _____

4) $\cos \theta - \cos^3 \theta$ 4) _____

Simplify the expression to either 1 or -1. Show work!

5) $\sin(x) \csc(-x)$ 5) _____

6) $\cot(-x) \cot\left(\frac{\pi}{2} - x\right)$ 6) _____

7) $\sin^2(-x) + \cos^2(-x)$ 7) _____

Simplify the expression to either a constant or a basic trig. function. Show work!

8) $\frac{\tan\left(\frac{\pi}{2} - x\right) \csc x}{\csc^2 x}$ 8) _____

9) $(\sec^2 x + \csc^2 x) - (\tan^2 x + \cot^2 x)$ 9) _____

10) Use the basic identities to change the expression to one involving only sines and cosines. Then simplify to a basic trig. function. Show work!

10) _____

10) $(\sin x)(\tan x + \cot x)$

11) $\sin x \cos x \tan x \sec x \csc x$

11) _____

12) $\frac{\tan x}{\csc^2 x} + \frac{\tan x}{\sec^2 x}$

12) _____

Combine the fractions and simplify to a multiple of a power of a basic trig. function(e.g. $3 \tan^2 x$). Show work!

13) $\frac{1}{\sin^2 x} + \frac{\sec^2 x}{\tan^2 x}$

13) _____

14) $\frac{\sec x}{\sin x} - \frac{\sin x}{\cos x}$

14) _____

Write each expression in factored form as an algebraic expression of a single trigonometric function. Show work!

15) $\cos^2 x + 2\cos x + 1$

15) _____

16) $1 - 2 \sin x + (1 - \cos^2 x)$

16) _____

17) $\cos x - 2\sin^2 x + 1$

17) _____

18) $4 \tan^2 x - \frac{4}{\cot x} + \sin x \csc x$

18) _____

19) Write each expression as an algebraic expression of a single trig. function
(e.g. $2 \sin x + 3$). Show work!

19) _____

19) $\frac{1 - \sin^2 x}{1 + \sin x}$

20) $\frac{\sin^2 x}{1 + \cos x}$

20) _____

Find all solutions in the interval $[0, 2\pi)$. You do not need a calculator. Show work!

21) $2 \cos x \sin x - \cos x = 0$

21) _____

22) $\tan x \sin^2 x = \tan x$

22) _____

23) $\tan^2 x = 3$

23) _____

Find all solutions to the equation. You do not need a calculator. Show work!

24) $4 \cos^2 x - 4 \cos x + 1 = 0$

24) _____

25) $\cos(\sin x) = 1$

25) _____

26) $\sin^2 x - 2 \sin x = 0$

26) _____

Find all solutions to the equation.

27) $\cos x = 0.37$

(Use a calculator. Express your answer in radians, as a decimal rounded to the nearest thousandth.)

27) _____

28) $\sin x = 0.30$

(Use a calculator. Express your answer in radians, as a decimal rounded to the nearest thousandth.)

28) _____

29) $\cos^2 x = 0.4$

(Use a calculator. Express your answer in radians as a decimal rounded to the nearest thousandth.)

29) _____